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NATIONAL INSECURITY: ITAR AND THE TECHNOLOGICAL IMPAIRMENT OF U.S. NATIONAL SPACE POLICY

JASON A. CROOK*

I. INTRODUCTION

IN THE EARLY YEARS of the sixteenth century, a war for economic supremacy broke out between the European powers vying for control of the Asiatic trade routes. Central to this struggle for economic domination was the possession of highly-sensitive navigational logs called rutters, which provided sailors with detailed information about the depth measurements, compass headings, and wind conditions one could use to survive the perilous oceanic crossing to reach the untold riches of the Far East.[1] Possession of these rutters was such a closely-guarded matter of national security that, as described by Clavell, "by [Portuguese] law any foreigner caught in possession of any rutter of theirs, let alone one that unlock[ed] the Magellan, [was] to be put to death at once. And if the rutter [was] found aboard an enemy ship, the ship [was] to be burned and all aboard executed without mercy."[2]

Although modern data protection methods are considerably less dramatic, the underlying principle of state control over certain types of information and technology impacting the national interest still remains alive and well. In the field of commercial space activity this control is particularly evident since "[s]pacecraft, including communications satellites, remote sens-

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[1] JOHN CLARKE, CLARKE'S BIBLIOTHECA LEGUM 341 (1819). "The Rutter of the sea, [containing] the havens, rodes, soundings, kennyngs, wyndes, floads, and ebbas, danngers, and coasts of divers regions . . . ." *Id.*

[2] JAMES CLAVELL, SHÔGUN 35 (1975).

ing satellites, scientific satellites, research satellites, navigation satellites, [and] experimental and multi-mission satellites" all fall under the regulatory auspices of the Arms Export Control Act, even if specifically intended for civilian use.[3] While there is a strong argument that this regulatory regime has impeded the competitive ability of the U.S. aerospace industry,[4] there is an equally strong argument that it has impeded the implementation of U.S. space policy as well.

To address this secondary argument, this article will consider the present state of the International Traffic in Arms Regulations as they relate to the United States' current space policy. Part I will provide a cursory overview of the export control regimes that exist at the national and supranational levels. Part II will discuss the historical development and modern focus of U.S. national space policy. Part III will analyze the practical impact these regulations are having in the civil and academic research environments. Part IV will identify solutions policymakers could adopt to achieve sensible security. Finally, Part V will offer concluding thoughts about reconciling America's security interests with its commitment to space exploration.

II. A BRIEF OVERVIEW OF EXPORT CONTROL REGULATIONS

Before delving into the technical intricacies of the arms export control protocols, it is important to first have an understanding of the different national and supranational regimes that impact the transfer of U.S. space technology. In the opening section of the Arms Export Control Act, Congress states that

> [i]n furtherance of world peace and the security and foreign policy of the United States, the President is authorized to control the import and the export of defense articles and defense services and to provide foreign policy guidance to persons of the United States involved in the export and import of such articles and services.[5]

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[3] *See* 22 C.F.R. § 121.1(c), Category XV(a) (2008).

[4] *See generally* Mike N. Gold, *Lost in Space: A Practitioner's First-Hand Perspective on Reforming the U.S.'s Obsolete, Arrogant, and Counterproductive Export Control Regime for Space Related Systems and Technologies*, 34 J. SPACE L. 163 (2008).

[5] 22 U.S.C. § 2778(a)(1) (2006). Respecting "defense services," this language was inserted

> to regulate training of foreign militaries in part as a result of the actions of former CIA officer Edmund Wilson, who worked for Libyan President Qaddafi by providing training to Libyan military and intelligence forces. The U.S. had few authorities to regulate Wil-

As part of this responsibility, "[t]he President is authorized to designate those items which shall be considered as defense articles and defense services for the purposes of this section and to promulgate regulations for the import and export of such articles and services. The items so designated shall constitute the United States Munitions List."[6]

By Executive Order 11,958, the President "delegated his rulemaking authority [under the Arms Export Control Act] to the Secretary of State . . . who has promulgated the International Traffic in Arms Regulations ("ITAR")."[7] "These regulations contain the United States Munitions List . . . a categorical list of 'defense articles' that cannot be exported without first obtaining a license from the Department of State."[8] Among the items specifically enumerated on this list are combat shotguns, nuclear warheads, nerve gas, and, perhaps anticlimactically, navigation satellites.[9] Any party seeking to export or facilitate the export of an item on this list to a party outside the United States must first obtain the proper permission from the State Department's Directorate of Defense Trade Controls before the transaction can proceed.[10]

As noted by John R. Liebman and Kevin J. Lombardo, "the intended use of the article or service after its export (i.e., for a military or civilian purpose) is not relevant in determining whether the article or service is subject to ITAR controls; the product's capability is the controlling concern."[11] While ITAR does not control "general scientific, mathematical, or engineering principles commonly taught in schools . . . or information in

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son's activities because the transfers did not involve U.S.-origin defense articles and were conducted outside the U.S.

John P. Barker, *Brokering Under the International Traffic in Arms Regulations*, in COPING WITH U.S. EXPORT CONTROLS 2008 181, 185 (2008).

[6] 22 U.S.C. § 2778(a)(1).

[7] United States v. Hsu, 364 F.3d 192, 194 (4th Cir. 2004).

[8] *Id.*

[9] *See* 22 C.F.R. § 121.1.

[10] John R. Liebman & Kevin J. Lombardo, *A Guide to Export Controls for the Non-Specialist*, 28 LOY. L.A. INT'L & COMP. L. REV. 497, 501 (2006). Here it is to be noted that an "export" does not simply refer to the transfer of an item outside the territory of the United States, but can also refer more broadly to the sharing of information with a foreign citizen—even if the conversation takes place at a secured location inside the United States. *See* MARTY HAUSER & MICAH WALTER RANGE, ITAR AND THE U.S. SPACE INDUSTRY 11 (2008), http://www.spacefoundation.org/docs/SpaceFoundation_ITAR.pdf.

[11] *See* Liebman & Lombardo, *supra* note 10, at 503.

the public domain,"[12] it does control the transmission of information "required for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance or modification of defense articles . . . [including] information in the form of blueprints, drawings, photographs, plans, instructions or documentation."[13]

One of the unique features of this enforcement regime is the reliance "on the business community to apply rigorous self-classification procedures to determine whether a given commodity or technology is subject to ITAR export controls."[14] For items or services which defy easy classification, ITAR "also sets forth a procedure that the exporter may invoke to obtain a 'commodity jurisdiction' (CJ) determination from [the Department of] State in cases of doubt."[15] While this refers to the procedure "used to determine whether an item or service is subject to export licensing authority [by] either [the Department of] State or Commerce," each licensing path is heavily dependent upon corporate self-regulation.[16]

At the supranational level, the United States is also a party to the Wassenaar Arrangement (Arrangement), a multilateral protocol designed to "contribute to regional and international security and stability, by promoting transparency and greater responsibility in transfers of conventional arms and dual-use goods and technologies."[17] Even if a particular good or service might normally be exported from the United States without its exporter having to obtain a license, "special export controls" may nevertheless prohibit this free transfer if the export is covered by the Arrangement or the Enhanced Proliferation Control Initiative.[18] This latter protocol applies to "the export of goods or the rendition of services to end-users or to countries who are known to present risks in terms of the proliferation of chemical

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[12] 22 C.F.R. § 120.10(a)(5) (2008).

[13] § 120.10(a)(1).

[14] *See* Liebman & Lombardo, *supra* note 10, at 505.

[15] *Id.*

[16] *Id.* The Department of Commerce uses Export Administration Regulations, or EARs, to control the exportation of commercial or "dual-use" commodities not purely military in function. *Id.* at 506. The effectiveness of this self-regulating system is due, in part, to the massive civil and criminal penalties that a company or individual can incur in the event of an arms export control violation. *See* 15 C.F.R. § 764.3 (2008).

[17] *See* Wassenaar Arrangement, Arrangement Introduction, http://www.wassenaar.org/introduction/index.html (last visited Aug. 15, 2009).

[18] *See* Liebman & Lombardo, *supra* note 10, at 511.

and biological weapons, missiles, and nuclear weaponry," while the Wassenaar Arrangement, as stated before, is a multilateral program that restricts the transfer of certain items by its member states.[19]

The implementation of the Wassenaar Arrangement owes its historical development and geopolitical purpose to the tactical realities of the Cold War. In the post-World War II era, "the United States and its allies implemented a new system of unilateral and multilateral export controls designed chiefly to prevent communist acquisition of Western military goods and technology."[20] Central to this mission was the Coordinating Committee for Multilateral Export Controls (COCOM), a group of nations who sought to control the proliferation of certain types of sensitive technology.[21] With the collapse of the Soviet Union in the early 1990s, COCOM was disbanded "due to its inability to meet the new post-Cold War demands."[22]

In place of this Cold War entity, a new multilateral framework was designed under the Wassenaar Arrangement that "could simultaneously control the spread of sensitive technologies while fostering the ability of the United States to export and maintain its share of the global technology market."[23] Even though "the scope of export controls in Participating States is determined by [Wassenaar Arrangement] lists, practical implementation varies from country to country in accordance with national procedures."[24] The United States, Slovenia, and Japan might all regulate the export of a particular space technology under the auspices of the Wassenaar Arrangement, yet each could take a completely different approach to doing so.

Given ITAR's fundamental purpose as the domestic means of protecting the nation's technology while also fostering "world peace and . . . security,"[25] it can be somewhat unclear at first as to why this seemingly-beneficial export regime is so pernicious. To understand the controversy which ITAR produces and the logistical challenges it can provoke, it is useful to consider the

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[19] *Id.* In practice, this operates much like an international version of the United States Munitions List.

[20] Kenneth A. Dursht, *From Containment to Cooperation: Collective Action and the Wassenaar Arrangement*, 19 CARDOZO L. REV. 1079, 1079 (1997).

[21] *Id.* at 1080.

[22] *Id.* at 1081.

[23] *Id.*

[24] *See* Wassenaar Arrangement, Frequently Asked Questions, http://www.wassenaar.org/faq/index.html (last visited Aug. 15, 2009).

[25] *See* 22 U.S.C. § 2778(a)(1) (2006).

historical events which have impacted the development of the current ITAR regime as it relates to the transfer of space technology. "During the Cold War, the policy of the United States was that all exports of space-related goods and technologies [would] be regulated by the State Department as munitions."[26] Because "the United States and the Soviet Union used space technology as a means of demonstrating technological superiority and as a means of keeping watch over each other's military assets," this policy made sense from a national security perspective.[27] As the Cold War began to wind down, however, "U.S. companies saw an opportunity to expand their business and they lobbied the government to ease some of the restrictions that were in place."[28]

In 1988, the U.S. government "lifted the ban on the use of Chinese launch vehicles for commercial satellites," an action which allowed American businesses to "take advantage of significantly lower launch prices."[29] Four years later, a presidential decree "ordered the removal of dual-use items from the USML unless they posed a clear danger to national security."[30] After several trade associations pointed out that the United States was the only nation that treated such satellites as munitions, the State Department "transferred jurisdiction of some commercial communications satellites to the Department of Commerce in 1992, provided that the satellites did not exceed certain technical specifications that would make them 'military-grade.'"[31] This transfer of jurisdiction was completed by October 1996, and from 1996 through 1999, commercial communications satellites and certain ancillary items were regulated by the Department of Commerce through the Commerce Control List instead of the State Department's ITAR regime.[32] This arrangement "put U.S. export controls in accord with those of the EU, Japan, and other Wassenaar Arrangement members which treat[ed] commercial satellites and related items as predominantly commercial items subject to less stringent export

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[26] *See* HAUSER & RANGE, *supra* note 10, at 13.

[27] *Id.*

[28] *Id.*

[29] *Id.*

[30] *Id.*

[31] *Id.*

[32] KARL W. ABENDSCHEIN & CORINNE C. JORGENSON, THE GLOBAL EXPLORATION STRATEGY: LEGAL PERSPECTIVES 5 (2008) (on file with author).

controls than those imposed on Munitions List items."[33] This arrangement changed in 1998, however, when:

> U.S. Congressional investigations discovered that [in] 1996 Hughes Electronics and Loral Space and Communications illegally transferred technology to China that may have improved the capabilities of China's intercontinental ballistic missiles. The assistance was provided in the wake of the February 1996 Intelsat 708 launch failure . . . . In response to the investigations and their conclusions the House and Senate, in Section 1513 of the 1999 National Defense Authorization Act, transferred jurisdiction over commercial satellites and satellite components exports from the Commerce Department to the State Department, and tightened restrictions on transferring U.S. made satellites, satellite components, equipment, and technical information (e.g., launch failure analysis) to foreign customers.[34]

In the wake of this scandal and Congress's reallocation of much of the national enforcement regime's responsibilities to the State Department, it has become evident that much of the criticism ITAR receives stems from the practical mechanics of its operation as opposed to the objective it seeks to advance. Unlike other items included on the United States Munitions List, space systems and launches are subject to heightened security requirements which place a considerably greater compliance cost on parties seeking to conduct space-related operations.[35] As U.S. policy currently states,

> [t]he export of any satellite or related item . . . or any defense service controlled by this subchapter associated with the launch in, or by nationals of, a country that is not a member of [NATO] or a major non-NATO ally of the United States *always* requires *special* exports controls, in addition to other export controls required by [ITAR].[36]

Among the additional export control requirements ITAR currently demands for space-related activities, parties must submit "a technology transfer control plan (TTCP) approved by the Department of Defense and an encryption technology control plan approved by the National Security Agency."[37] They must also "make arrangements with the Department of Defense for monitoring [with] [t]he costs of such monitoring services [to] be

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[33] *Id.*

[34] *Id.*

[35] *See* 22 C.F.R. § 124.15 (2008).

[36] § 124.15(a) (emphasis added).

[37] § 124.15(a)(1).

fully reimbursed to the Department of Defense by the U.S. person receiving such services."[38] "Technical discussions and activities, including the design, development, operation, maintenance, modification, and repair of satellites" must all be monitored, as must any "satellite . . . launch[ing] activities, including launch preparation, satellite transportation, integration of the satellite with the launch vehicle, testing and checkout prior to launch, . . . and return of equipment to the United States."[39]

In a survey conducted by the Space Foundation in 2007 asking U.S. companies whether ITAR in its present form protected the national security interests of the United States, only ten percent of respondents believed that it did not.[40] As the Space Foundation's report noted, "[t]his corresponds closely with a 2006 survey of executives in the broader aerospace and defense community, which revealed that two out of three believed that the export control system effectively protected U.S. national security interests."[41] In this same survey, however, nearly seventy percent of respondents indicated that ITAR was responsible for some amount of delay in technical assistance and support and nearly seventy-five percent reported similar delays for marketing and sales.[42] While the majority of the U.S. space industry appears to recognize that "there are valid national security concerns with regard to space technology that ITAR is trying to protect," these same businesses also maintain that the export control process "is not *fully* protecting the interests of the United States because it is damaging the health of the space industrial base."[43] Because "foreign firms do not have to deal with

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[38] § 124.15(a)(2).

[39] *Id.* As noted by Mike Gold of Bigelow Aerospace, the monitoring requirements foisted upon space actors can often result in bizarre practices such as the 24-hour guarding of the Genesis I stand which, if "placed upside down [and] covered with a nice checkered tablecloth" would resemble a metal coffee table. Gold, *supra* note 4, at 172.

[40] *See* HAUSER & RANGE, *supra* note 10, at 3.

[41] *Id.*

[42] *Id.* at 4.

[43] *Id.* at 3. Here the Space Foundation noted that

> [a] large prime contractor is likely to have an entire department of staff working on ITAR compliance for the company as a whole, and these people have the experience necessary to handle any space-related ITAR paperwork. By contrast, second- and third-tier suppliers are more likely to be at a disadvantage as they may not have the personnel to ensure that everything is being done in accordance with ITAR. The proportional cost of ensuring compliance is much

an equivalent set of export regulations," many businesses believe that "[ITAR] gives [foreign businesses] a competitive advantage in the global marketplace" which American companies simply cannot match.[44] These businesses argue that this regulatory disparity potentially "reduces the competitiveness of [the U.S.] space industry in the global market and potentially harms the domestic innovation processes that enable U.S. space leadership."[45]

III. THE RISE AND DEVELOPMENT OF U.S. SPACE POLICY

With the Soviet launch of Sputnik, the world's first artificial satellite, on October 4, 1957, the United States experienced "a national concern that [it] was falling behind the USSR in its science and technology capabilities and thus might be vulnerable to a nuclear missile attack. The resulting competition for scientific and technological superiority came to represent a competition between capitalism and communism."[46] Spurred to action by the military realities of this ideological struggle, within ten months after Sputnik's launch, Congress and the Eisenhower Administration took action to establish NASA, the Defense Advanced Research Projects Agency (DARPA), and to reform the elementary and post-secondary education curriculum to include a greater emphasis on science, technology, and engineering.[47]

Nearly ten years to the day after Sputnik's launch, the United States, the United Kingdom, and the Soviet Union entered into a "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies."[48] Commonly known as the Outer Space Treaty, this agreement placed a significant measure of importance on multilateral cooperation in the post-World War II

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higher for them, up to eight times that of a first-tier supplier, and this is a significant concern since many lower-tier suppliers have relatively small profit margins.

Id. at 7.

[44] *Id.* at 4.

[45] *Id.* at 1.

[46] DEBORAH D. STINE, U.S. CIVILIAN SPACE POLICY PRIORITIES: REFLECTIONS 50 YEARS AFTER SPUTNIK 2, CRS REPORT FOR CONGRESS (June 20, 2008), *available at* http://fpc.state.gov/documents/organization/108077.pdf.

[47] *Id.* at 3.

[48] Stephen Gorove, *The Concept of "Common Heritage of Mankind": A Political, Moral or Legal Innovation?*, 9 SAN DIEGO L. REV. 390, 392 n.11 (1972).

era.[49] As the treaty's preamble states in part, "[d]esiring to contribute to broad international cooperation in the scientific as well as the legal aspects of the exploration and use of outer space" and "[b]elieving that such cooperation will contribute to the development of mutual understanding and to the strengthening of friendly relations," the State Parties to the Treaty agreed to certain cooperative provisions.[50]

Such an emphasis on international cooperation still remains an overriding theme in U.S. space policy. In the 2004 report of the President's Commission on Implementation of United States Space Exploration Policy, the Commission observed that "[i]nternational talents and technologies will be of significant value in successfully implementing the space exploration vision," with the recommendation that "NASA pursue international partnerships based upon an architecture that would encourage global investment in support of the vision."[51] Two years later in President Bush's August 31, 2006 declaration of U.S. National Space Policy, the United States further committed itself to "seek to cooperate with other nations in the peaceful use of outer space to extend the benefits of space, enhance space exploration, and to protect and promote freedom around the world," while also working to "[e]ncourage international cooperation with foreign nations and/or consortia on space activities that are of mutual benefit and that further the peaceful exploration and use of space, as well as to advance national security, homeland security, and foreign policy objectives."[52] To accomplish these goals, the Secretary of State was directed to take the lead in "carry[ing] out diplomatic and public diplomacy efforts . . . to encourage the use of U.S. space capabilities and systems by friends and allies."[53]

In contrast to this principal theme of working to ensure international cooperation and the achievement of common goals, the same document also appears to introduce a stumbling block to this objective. While stating that "[a]s a guideline, space-re-

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[49] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, U.S., Soviet Union, U.K., Preamble, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205.

[50] *Id.*

[51] President's Commission on Implementation of United States Space Exploration Policy, A Journey to Inspire, Innovate, and Discover 9 (2004), http://www.nasa.gov/pdf/60736main_M2M_report_small.pdf.

[52] U.S. National Space Policy (Unclassified) 1–2 (Aug. 31, 2006), http://www.nss.org/resources/library/spacepolicy/2006NationalSpacePolicy.htm.

[53] *Id.* at 7.

lated exports that are currently available or are planned to be available in the global marketplace shall be considered favorably," the policy went on to state further in the same paragraph that

> [e]xports of sensitive or advanced technical data, systems, technologies, and components, shall be approved only rarely, on a case-by-case basis. These items include systems engineering and systems integration capabilities and techniques or enabling components or technologies with capabilities significantly better than those achievable by current or near-term foreign systems."[54]

While the United States had committed itself to encouraging international cooperation and the use of American space capabilities by friendly foreign nations, it also affirmed that, in some cases, the underlying technology used to support these endeavors was to remain a "rarely" shared secret.[55]

IV. CASE STUDIES

In a clear example of how one aspect of national policy can quickly impede another, talks between the United States and the governments comprising the European Space Agency (ESA) recently broke down due to European concerns that U.S. technology transfer laws would prove too restrictive to effectively permit a Mars rover joint-development program to succeed.[56] As Daniel Sacotte, head of ESA's Human Spaceflight program, was quoted as saying, "[i]t's a shame, but it's not for me to comment on U.S. law, only to note its effects, and for the rover,

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[54] *Id.* at 9.

[55] It is unclear from a reading of the Policy whether this "approved only rarely" language is meant to apply strictly to military-grade technologies or to certain civilian articles as well. Viewing Part 12 in its entirety, the first sentence declaring that "space-related exports that are currently available or are planned to be available in the global marketplace shall be considered favorably" can arguably be read as encouraging the export of items—whether military or civilian—which could already be purchased on the open market. This could be because there is no perceived harm in transferring technology to foreign partners if it could just as easily be acquired from another open-market source. Looking to the "sensitive or advanced" sentence, however, this would seem to preclude the export of American technology for either civilian or military purposes if it is of a type not commonly available for open market purchase. Given that many space-related exports could by their very nature be classified as sensitive or advanced, the distinction between the two policies articulated in Part 12 seems to hinge on whether the technology is currently available in the open market, as opposed to whether it meets a particular "sensitive" threshold. *See id.*

[56] Peter de Selding, *ESA Looks East for Future Space Cooperation*, SPACE NEWS, May 30, 2005, http://www.space.com/spacenews/businessmonday_050530.html.

ITAR would have made cooperation too complicated to be feasible."[57] The article also notes that the ESA "is gradually coming to the conclusion that the U.S. legal regime known as ITAR . . . will foreclose whole categories of trans-Atlantic cooperative efforts in space exploration."[58]

As chilling as this effect on international cooperation in the particular instance might be, there is an additional danger that the ITAR regime will preclude the United States from engaging in other nationally-beneficial ventures. Quoting Sacotte, "[w]e are now obliged to develop our autonomy in various areas, which is no bad thing. We are fully capable in Europe of developing these technologies. We may also find partners besides NASA."[59] In the context of future developments, many European officials believe that Europe

> cannot limit [itself] to subcontractor work by one or another company that may or may not continue through development. . . . NASA has always excluded international partners from significant work shares on a program like the Crew Exploration Vehicle. We expect that to remain the case. That is why we are looking toward Russia and Japan [instead] for a joint program."[60]

In a similar challenge to the U.S. National Space Policy objectives, critics have also blamed ITAR for slowing down the collaboration necessary to finish the International Space Station. Given that "ITAR regulations require U.S. contractors to obtain what is known as a Technical Assistance Agreement, or TAA, to share controlled information and technology with non-U.S. citizens," important communication between American and European contractors has often been delayed.[61] "ITAR restrictions have caused inefficiencies and have been a distraction to training and ATV [Automated Transfer Vehicle] procedure development," according to one government official, simply because the restrictions "[make] it difficult to get information on each other's systems that [U.S. and European contractors] need to operate together, in a timely way . . . ."[62]

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[57] *Id.*

[58] *Id.*

[59] *Id.*

[60] *Id.*

[61] Brian Berger & Peter B. de Selding, *ITAR Complicates Preparations for New Station Supply Vehicle*, SPACE NEWS, Apr. 11, 2007, http://www.space.com/spacenews/archive07/itarnasa_0409.html.

[62] *Id.*

These impediments are particularly galling to many European officials "who contend their cooperation with NASA on the international space station program is already covered by the intergovernmental agreement the space station partners signed in September 1988, and a nearly identical document signed a decade later in June 1998 following Russia's entry into the partnership."[63] Compounding the challenge even further is the lack of a "standard TAA form that is crafted at the State or Defense departments. TAAs are written by companies individually and reflect the companies' occasionally worst-case assessment of the risks, resulting in the most restrictive language possible."[64] Because of its cumbersome approval process and lack of standardization, "'[y]ou will get 10 TAAs from 10 different companies, and there are often substantial differences between them,' . . . . Any modification to a TAA can take months to make its way through State and Defense, even if the modification is only to change an address . . . ."[65]

In a May 26, 2000 letter to Senator Jeff Bingaman, Charles Kruger of Stanford University articulated many of the challenges the ITAR regime presents to other institutions, such as schools and universities engaging in collaborative research and development projects.[66] Since two of the "fundamental goals" of U.S. Space Policy are to "[i]ncrease the benefits of civil exploration [and] scientific discovery," while also allowing "a robust science and technology base" to develop,[67] the restrictions imposed by ITAR can, once again, be seen as impeding a direct governmental policy objective:

> Just one sentence [invoking ITAR] . . . was all it took to ban a Stanford graduate student, who is Chinese, from continuing his work with basic spacecraft control algorithms. It was enough to prevent the world's expert in proton monitors, who is Irish, from being in the same room as the equipment he designed when American researchers bolted it onto a satellite. It prevented the signing of a contract that would allow Japanese, Stanford and Lockheed researchers to collaborate in studying the sun. One sentence was all it took to place satellite programs in holding

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63 *Id.*

64 *Id.*

65 *Id.*

66 Letter from Charles Kruger, Vice Provost and Dean of Research and Graduate Policy, Stanford Univ., to Senator Jeff Bingaman, United States Senate (May 26, 2000), *available at* http://www.stanford.edu/dept/DoR/C-Res/itar_letter.html [hereinafter Kruger].

67 *See* U.S. National Space Policy, *supra* note 52, at 2.

> patterns at universities including Stanford, Caltech, Penn State, MIT and the Universities of California, Arizona and Colorado.[68]

Providing another illustration of the hurdles ITAR can impose on the American scientific community, Kruger then referenced the case of a Chinese student who "wrote software for a long-standing NASA basic physics project" designed to test Einstein's theory of relativity.[69] This project was "not intended for and could not be put to military use [and] all of the information and technology surrounding the scientific equipment [was] in the public domain."[70] Nevertheless, when "[t]he researcher sent his software to NASA for their review . . . NASA stamped the report and the software 'ITAR-controlled' and insisted that the individual who wrote it now need[ed] an export license to review it."[71]

In a third example of how ITAR can place significant economic restrictions on universities conducting important scientific research, Kruger also outlined the challenges of securing launch capability for one of the school's most basic satellite research projects:

> One of our doctoral students built a small satellite as his thesis project, using technology in the public domain and parts purchased at a local commercial electronics shop. Unable to obtain launch space with a private company or on a NASA vehicle, the student enterprisingly looked for another provider. Ultimately, the Baumann Space Center at the University of Moscow offered to let the student put his satellite on their rocket launch without charge. However, ITAR as presently worded appears to preclude this type of cooperation, notwithstanding the fact that the satellite is neither suitable nor intended for any military use. This student has not yet secured a launch and therefore cannot test his project. It would cost the university $500,000 to $2,000,000 to secure a private launch for the satellite.[72]

Imposing such heavy costs on the academic community diverts much-needed resources away from critical areas of research and development, and can thus be seen as directly impeding the development of the "robust science and technology base" articulated as a goal of the U.S. National Space Policy.[73]

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[68] *See* Kruger, *supra* note 66.

[69] *Id.*

[70] *Id.*

[71] *Id.*

[72] *Id.*

[73] *See* U.S. National Space Policy, *supra* note 52, at 2.

Notable as these examples are, however, the burden imposed on the nation's commercial space industry is even more striking. In an August 21, 2008 article appearing in The Economist, it was pointed out that

> [p]rime contractors, such as Boeing and Lockheed Martin, can absorb ITAR's costs as part of doing business. But the second-tier contractors that support them and the third-tier component suppliers are having much more trouble. The burden of compliance on [these] component-makers was nearly 8% of foreign sales in 2006.[74]

Left unchecked, "the Pentagon fears it may have to start buying satellite components overseas" simply because ITAR will have financially crippled America's innovative science and technology base.[75]

Perhaps the most unsettling aspect of ITAR's current model and method of implementation is the cumulative effect this regime might have on the United States' national security objectives. In a hearing conducted by the Senate Subcommittee on Space, Aeronautics, and Related Sciences, Dr. Frederick A. Tarantino of the Universities Space Research Association testified:

> Space is strategic for many nations, and we are in the midst of a massive internationalization of it. In 2005, China became the third nation to fly a human in space. European Space Agency nations, Japan, China, Russia, and India are all resourcing and planning major long-range space science programs, including lunar and planetary missions. China is developing a robotic nuclear-powered lunar rover as the second phase of their lunar program. Japan and China sent probes (Kaguya and Chang'e-1) to the moon in 2007, and India's launch of Chadrayaan-1 is scheduled for 2008. While the U.S. scientific community is restricted in its foreign collaborations under International Traffic in Arms Regulations (ITAR), ESA is collaborating extensively with China, India, and Japan in their lunar explorations. A hesitant approach to exploration will cede U.S. supremacy in space to other nations.[76]

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[74] *Space Technology: Earthbound*, ECONOMIST, Aug. 23, 2008, *available at* http://www.economist.com/displaystory.cfm?story_id=11965352 [hereinafter ECONOMIST].

[75] *Id.*

[76] *Reauthorizing the Vision for Space Exploration: Hearing Before the H. Subcomm. on Space, Aeronautics, and Related Sciences*, 110th Cong. 2 (2008) (statement of Dr. Frederick A. Tarantino, CEO and President University Space Research Associa-

Given the explicit policy recognition that "[i]n this new century, those who effectively utilize space will enjoy added prosperity and security and will hold a substantial advantage over those who do not" and that "[i]n order to increase knowledge, discovery, economic prosperity, and to enhance National security, the United States must have robust, effective, and efficient space capabilities,"[77] a "hesitant approach" that "cede[s] U.S. supremacy in space to other nations" may very well cost the United States its technological lead while also jeopardizing its security.[78] As the National Academics' Committee on Prospering in the Global Economy of the 21st Century wrote, "We fear the abruptness with which a lead in science and technology can be lost—and the difficulty of recovering a lead once lost, if indeed it can be regained at all."[79]

V. ACHIEVING SENSIBLE SECURITY

While the prospects of reforming ITAR might initially appear to be somewhat daunting, it is nevertheless possible to have a security regime that protects American technology while also meeting the stated objectives of U.S. National Space Policy. Even though the objectives of "international cooperation with foreign nations"[80] and "advanc[ing] national security"[81] might appear to be inherently incompatible in the context of sharing advanced technology, ITAR does not have to be an impediment to U.S. National Space Policy if it is reformed in the correct way.

First, it is important for policymakers to acknowledge the technological and geopolitical realities of the post-Cold War world. As noted by George Abbey and Neal Lane in a report prepared for the American Academy of Arts and Sciences:

> During the Cold War, the United States and the Soviet Union competed with one another, both on earth and in space; today, the two nations are working together. In November of 2001 . . . Russian President Vladimir Putin spoke at Rice University. In his

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tion), *available at* http://commerce.senate.gov/public/_files/TarantinoUSRAWrittenTestimony.pdf.

77 *NASA Exploration Programs: Hearing Before the H. Subcomm. on Space and Aeronautics*, 110th Cong. (2008) (statement of Richard J. Gilbrech, Associate Administrator Exploration Systems Directorate National Aeronautics and Space Administration), *available at* http://www.spaceref.com/news/viewsr.html?pid=27549.

78 *See Reauthorizing the Vision for Space Exploration, supra* note 76.

79 *Id.*

80 *See* U.S. National Space Policy, *supra* note 52, at 2.

81 *Id.*

> speech, he said, "We have long . . . been cooperating in [the] space exploration field. And the creation, the establishment of the international space station is [an] 85 percent bilateral Russian-American project." The space station is an excellent example of international cooperation, not only between two Cold War adversaries, but also among sixteen nations around the world—Belgium, Brazil, Canada, Denmark, France, Germany, Japan, Italy, the Netherlands, Norway, Russia, Spain, Sweden, Switzerland, the United States, and the United Kingdom.[82]

With such widespread international cooperation taking place to achieve large-scale common objectives, "the United States should recognize that space is no longer dominated by two world powers. Rather, it is an international domain of commerce, science and exploration, environmental monitoring, and understanding. The laws of physics work just as well in Mandarin as in English."[83]

The second important development that American policymakers must acknowledge is the increase in the number of countries which have developed—or are rapidly developing—an indigenous space industrial community. As Daniel Sacotte of the European Space Agency remarked in the aftermath of the collapse of the Mars rover joint-development negotiations, "[w]e are now obliged to develop our autonomy in various areas, which is no bad thing. We are fully capable in Europe of developing these technologies. We may also find partners besides NASA."[84] Rather than fostering an environment in which NASA and American businesses can work to satisfy the needs of foreign partners, ITAR has instead created a strong incentive for foreign nations to develop their own industries at America's expense. As Abbey and Lane observed in their report:

> In the past, U.S. companies frequently prevailed in international competition, as the international industry considered American technologies superior and American satellites more reliable than those manufactured by other nations. Today, because of export control regulations, U.S. companies find themselves at a serious competitive disadvantage . . . . Based on Satellite Industry Association data, the U.S. share of global satellite sales plummeted from 64 percent of the $12.4 billion market in 1998 to 36 percent

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[82] GEORGE ABBEY & NEAL LANE, UNITED STATES SPACE POLICY: CHALLENGES AND OPPORTUNITIES 6 (2005), *available at* http://www.amacad.org/publications/spacepolicy.pdf.

[83] *Id.*

[84] *See* de Selding, *supra* note 56.

> in 2002. Foreign customers, even from allied nations, are unwilling to purchase satellites from U.S. manufacturers when they face restrictions on the acquisition of technical and test data and operating information on their purchased satellite, as well as significant delays in obtaining approvals. Indeed the costs, delays, and complications that accompany the use of U.S. components in satellites built by other companies in other nations are so notorious that certain European manufacturers have begun advertising their products as "ITAR free" to attract customers.[85]

In one of the clearest examples of ITAR's counterproductive incentives, the report notes that "ESA and CNES [(Centre National d'Etudes Spatiales)] have also embarked on a $33.4 million program called the European Component Initiative, which will develop production lines for systems that are critical to satellites and currently available only from U.S. companies."[86]

In view of these two developments, there are a variety of modifications government policymakers can introduce into ITAR and the export control process that will allow American entities—both public and private—to effectively interface with global partners while also maintaining U.S. national security. Given that most of the objections to ITAR focus on its practical implementation instead of its substantive ideology,[87] simple principles of organizational efficiency could be employed to improve the program's effectiveness while also alleviating many of its sources of current criticism.

First, by creating a standardized Technical Assistance Agreement (TAA) form outlining the level of transfer risks the government deems appropriate, the State Department could take much of the "worst case scenario" guess-work out of the TAA drafting process.[88] By introducing a measure of uniformity into this area, the government could avoid the problem of having "10 TAAs from 10 different companies," with "substantial differences between them,"[89] and instead move to a transfer regime that offers greater predictability to foreign partners. Since "ESA has been asked to sign a number of TAAs by U.S. companies . . . [that] contain language that ESA cannot accept" and consider-

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[85] *See* ABBEY & LANE, *supra* note 82, at 10.

[86] *Id.*

[87] *See* U.S. National Space Policy, *supra* note 52, at 2.

[88] This could operate much like an SEC "no-action" letter in which the Commission informs the requesting party that it will not regard a particular activity as a violation of the U.S. securities laws.

[89] *See* Berger & de Selding, *supra* note 61.

ing "that some U.S. companies draft TAAs that presume to supersede ESA's immunity from certain U.S. laws," providing a standardized TAA form to American exporters would offer assurance that they are operating in compliance with U.S. restrictions while also addressing some of the sovereign immunity concerns that foreign partners might raise.[90] The cost savings many smaller companies would experience through the reduction in legal fees required to draft these documents would also be a substantial benefit.

A second reform policymakers could consider is the adoption of an end-user licensing system for certain allied nations, instead of a transaction-by-transaction approval process. As the Space Foundation noted in its recommendations on ITAR and the U.S. Space Industry:

> If wars in the future are to be multilateral affairs, it is essential for the U.S. military to achieve interoperability with the forces supplied by allied nations. The battlefield is the worst place to accomplish this task; it is safer for the troops if they are prepared beforehand to work with their allies when the time comes. Ideally, . . . the equipment of U.S. allies [would be] compatible with U.S. space systems or at least capable of being easily adapted for interoperability.[91]

By entering into bilateral export agreements with trusted allies such as Australia and the United Kingdom, the United States could streamline the ITAR approval process so that joint missions like the Mars rover and the International Space Station take place in a much more cooperative atmosphere. Since the State Department approved 99% of the more than 8,000 licenses requested by these two nations in 2007, the practical nature of these relationships would not be affected, but the process for interacting with them would certainly be streamlined.[92]

Additionally, adopting an end-user system for ITAR approval instead of a transaction-based model would allow

> close U.S. allies [to] have prompt access to the equipment and support they need to engage in future coalition [and scientific] operations. Companies and agencies would be able to perform the same tasks that they are already doing, but in a more timely

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[90] *Id.*

[91] *See* HAUSER & RANGE, *supra* note 10, at 5.

[92] *Id.*

> and efficient manner, which increases the likelihood of undertaking more projects of mutual benefit.[93]

Such an approach would also comport with previous U.S. practice since "cooperation with NASA on the international space station program is already covered by the intergovernmental agreement the space station partners signed in September 1988 . . . ."[94]

A final recommendation worthy of consideration is the transfer of certain dual-use satellite technologies away from the United States Munitions List and onto the Commerce Department's Commerce Control List or some similar regulatory schema. By classifying these items accordingly, the United States would place its "export controls in accord with those of the EU, Japan, and other Wassenaar Arrangement members which treat commercial satellites and related items as predominantly commercial items subject to less stringent export controls than those imposed on Munitions List items."[95] In recognition of the overall goal of export control policy—preventing hostile parties from acquiring sensitive technology—the United States should "define the categories of goods and technical knowledge more clearly and appropriately" so that a more responsive protection regime can be established.[96]

By "assess[ing] the current state of military technology and determin[ing] what is inappropriate for export," the United States' control regime could more effectively

> take into account the availability of spacecraft components on the global market so as not to prevent U.S. companies from selling goods that could have been purchased from a foreign competitor . . . the list of controlled items should be narrowed significantly to include only the parts of a spacecraft that can truly be said to be sensitive technology.[97]

Given that export controls also

> apply to people, including scientists and graduate students, as well as technologies and products[,] [a]mbiguity in the regulations and a slow and cumbersome process of review and approval can hinder progress for research scientists . . . and government

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93 *Id.*

94 *See* Berger & de Selding, *supra* note 61.

95 *See* ABENDSCHEIN & JORGENSON, *supra* note 32.

96 *See* HAUSER & RANGE, *supra* note 10, at 6.

97 *Id.*

> laboratories . . . . The United States, long the world leader in most fields of space science, engineering, and technology,

could retain its leadership position simply by periodically evaluating what technology is truly sensitive.[98]

VI. CONCLUSION

As President John F. Kennedy once said, "[t]he exploration of space will go ahead, whether we join in it or not, and it is one of the great adventures of all time, and no nation which expects to be the leader of other nations can expect to stay behind in the race for space."[99] Such sentiments ring especially true nearly fifty years later, as the United States struggles to retain its position of technological leadership as it continues to use an export control regime which directly impedes the growth and development of the U.S. space program. While there is no shortage of information indicating the effect ITAR has had on the commercial space industry, there is an increasing body of evidence that these same policies are also impeding the official goals and objectives of the U.S. National Space Policy. If international cooperation and the advancement of a robust science and technology base are to be achieved, ITAR must be reformed to permit greater information-sharing with trusted partners and allies.

As mentioned throughout this article, much of the opposition that ITAR currently faces could be alleviated by removing many of the "special export controls" that are specifically directed toward the space community. Is it really necessary for NASA to have to reimburse the Department of Defense for the cost of monitoring its activities with the European Union when these activities take place inside a NASA facility? Should the United States really be in the business of guarding non-essential items, such as Bigelow Aerospace's "metal coffee table," when the proliferation of such technology has absolutely no sensitive impact on the national interest? Given that every dollar spent on ITAR compliance is a dollar that is unavailable for advancing research and development, the current cost regime can easily be seen as a direct budgetary transfer from one government agency to another without any demonstrable benefit.

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[98] *See* ABBEY & LANE, *supra* note 82, at 11.

[99] John F. Kennedy, Address at Rice University on the Nation's Space Effort (Sept. 12, 1962), http://www.jfklibrary.org/Historical+Resources/JFK+in+History/Space+Program.htm (follow "Address at Rice University" hyperlink).

Even if certain specialized export controls are needed for the space community, the manner in which these controls are implemented could go a long way toward enhancing the willingness of international partners to cooperate with the United States. Given that ESA and other space agencies like CNES are still conducting research missions—albeit without the United States—and an increasing number of nations are developing "ITAR-free" space industries to draw international customers away from U.S. contractors, the current arms control regime, if left unreformed, will continue to undermine the security objectives articulated in the U.S. National Space Policy. Is the national interest truly served when the Pentagon fears it will have to eventually purchase satellite components from non-American sources simply because there will not be any American businesses left to supply them?[100] Will the United States have achieved greater technological security when many of its space-related programs are outsourced to foreign countries for completion? Given the laudatory purpose ITAR seeks to serve, it would be highly unfortunate for a program designed to protect the nation's security to be responsible for helping undermine it.

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[100] *See* ECONOMIST, *supra* note 74.